

FILED: 2001 MAR 21 13 00

APPROVED	O.G. FIG.	
BY	CLASS	SUBCLASS
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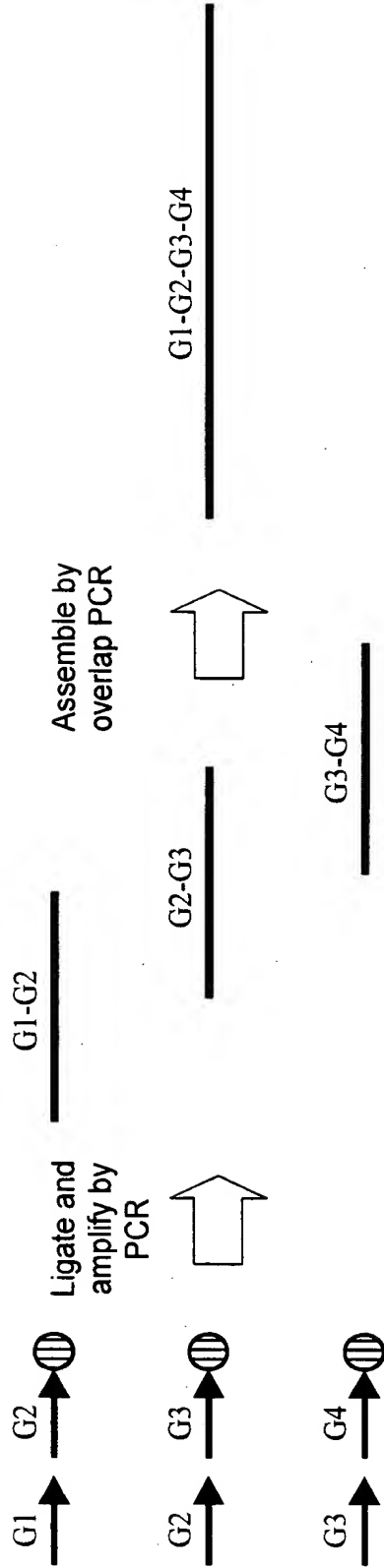


Figure 1

SECRET

APPROVED	O.G. FIG.	
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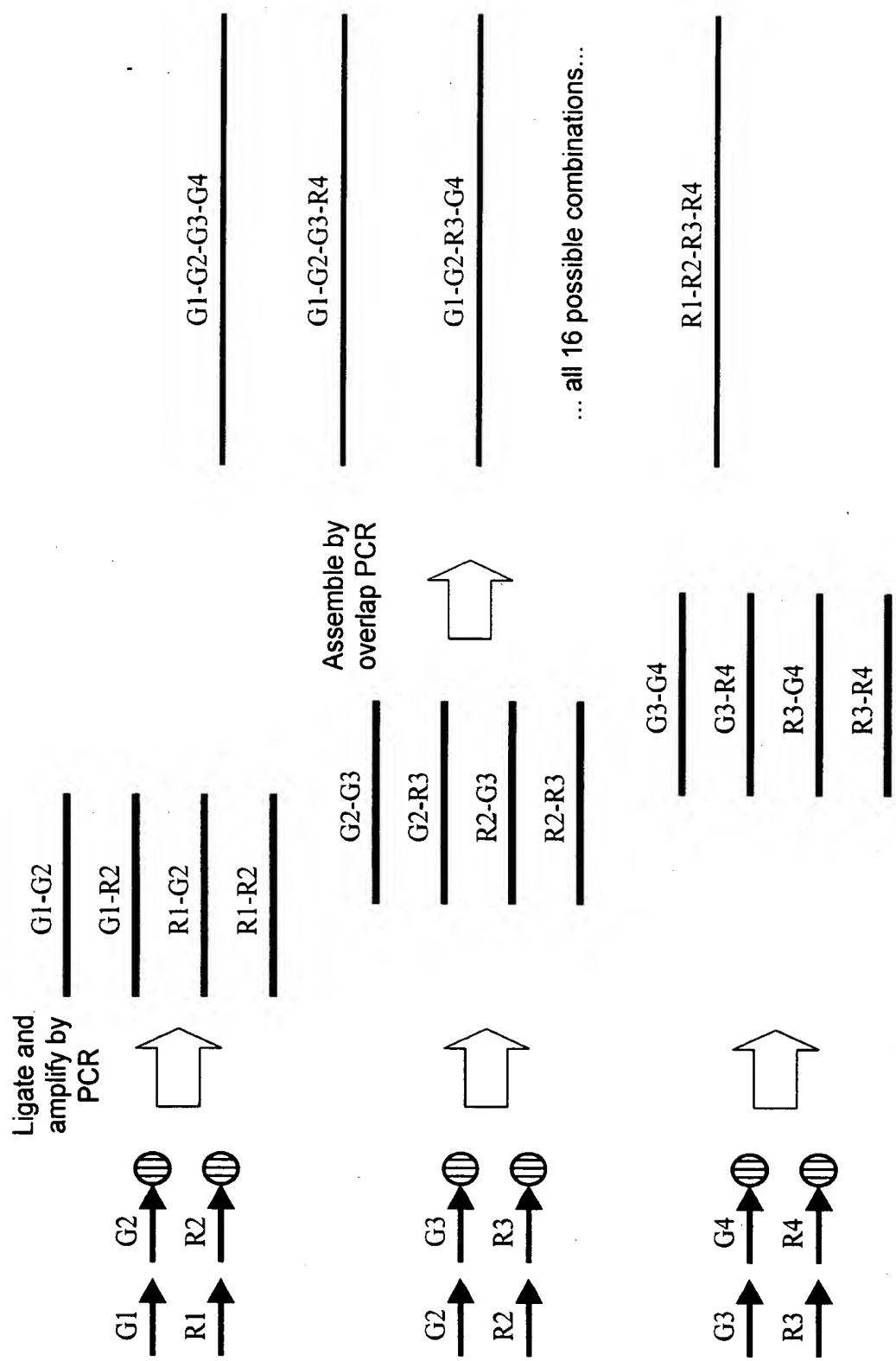


Figure 2

APPROVED	O.G. FIG.	
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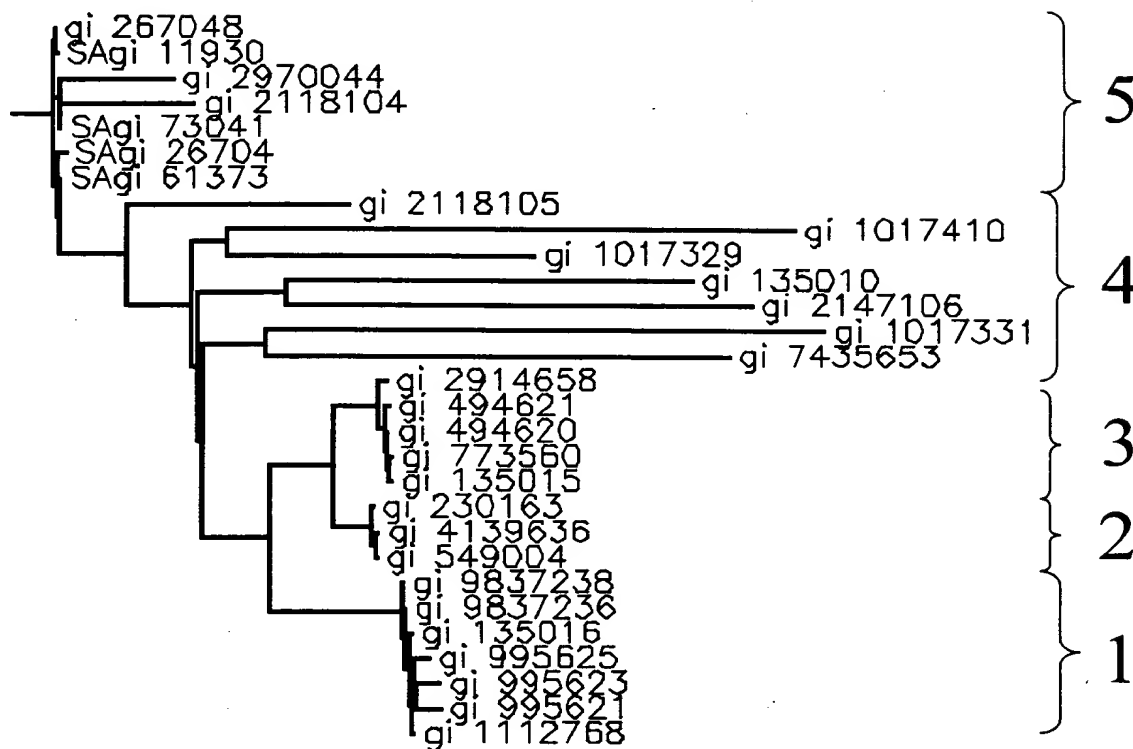


Figure 3

FILED 00-04-2001

Amino Acid Sequence Alignments for 29 Subtilisin Carlsberg Related Proteins

SAgi 11930	-----M	KKPLGKIVAS	TALLISVAFS	SS-----	-----
gi 267048	-----	-----	-----	-----	-----
SAgi 73041	-----	-----	-----	-----	-----
SAgi 61373	-----	-----	-----	-----	-----
SAgi 26704	-----	-----	-----	-----	-----
gi 2970044	-----M	NKKMGKIVAG	TALIISVAFS	SS-----	-----
gi 2118104	-----M	KKLFTKVVAS	AALLLSISLT	AT-----	-----
gi 2118105	MNLQKIRSAL	KVKQSALVSS	LTILFLIMLV	G-----	-----
gi 1112768	-----MMRK	KSFWLGMLTA	FMLVFTMAFS	DS-----	-----
gi 135016	-----MMRK	KSFWLGMLTA	FMLVFTMAFS	DS-----	-----
gi 9837236	-----MMRK	KSFWLGMLTA	LMLVFTMAFS	DS-----	-----
gi 995621	-----MMRK	KSFWLGMLTA	FMLVFTMAFS	DS-----	-----
gi 995623	-----MMRK	KSFWLGMLTA	LMLVFTMAFS	DS-----	-----
gi 995625	-----MMRK	KSFWFGMLTA	FMLVFTMEFS	DS-----	-----
gi 9837238	-----	-----	-----	-----	-----
gi 549004	-----MRS	KKLWISLLFA	LTLIFTMAF-	SN-----	-----
gi 4139636	-----	-----	-----	-----	-----
gi 230163	-----	-----	-----	-----	-----
gi 135015	-----MRG	KKVWISLLFA	LALIFTMAFG	ST-----	-----
gi 773560	-----	---MISLLFA	LALIFTMAFG	ST-----	-----
gi 494620	-----	-----	-----	-----	-----
gi 494621	-----	-----	-----	-----	-----
gi 2914658	-----	-----	-----	-----	-----
gi 1017329	-----	MKRRVHVLIM	TILMIVLATG	TA-----	-----
gi 2147106	---MKKFKR	KGRLLDEKHE	MAIFFLFLLV	IL-----	-----
gi 135010	-----M	KNMSCKLVVS	VTLFFSFLTl	GP-----	-----
gi 7435653	---MVAVVTG	VIQVGTKIAA	IAIALIFILP	LF-----	-----
gi 1017410	-----MKT	MKTLVIVIGV	LALLFIVAIG	HVRDQDQALI	QTKEIPKTL
gi 1017331	-----MNKR	LKRWSAIMSI	VLLVNLLVPV	GT-----	-----

[illegible]

APPROVED	O.G. FIG.	
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Figur 4C

LIGFNS--D-	-----	KAKGLIQNAG	G-----	-----
IVGFKS--G-	-----V	KTAS--VKKD	IIKESGG--	-----
IVGFKS--G-	-----V	KTAS--VKKD	IIKESGG--	-----
IVGFKS--G-	-----V	KTAS--VKKD	IIKESGG--	-----
IVGFKS--G-	-----V	KTAS--VKKD	IIKESGG--	-----
IVGFKS--G-	-----V	KTAS--VKKD	IIKESGG--	-----
FVGFKS--G-	-----V	KTAS--VKKD	IIKESGG--	-----
IVGFKQ--T-	-----M	SAMSSAKKKD	WISEKGG--	-----
IVGFKQ--T-	-----M	STMSAAKKKD	WISEKGG--	-----
IVGFKQ--T-	-----M	STMSAAKKKD	WISEKGG--	-----
LVGFKN--E-	-----A	AVQAFSNNVT	TS-----	-----
MILFRH----	-----H	IDDGILKKYD	I-----	-----
IVVYKN----	-----K	AGKETILDSD	A-----	-----
VVIAKINPE-	-----E	FNPKAVEALQ	G-----	-----
MLIGESTDDG	RLIGELNLE	FVKKYVKDIA	AVADTNGNFF	IGGDNPDVSW
IVTYKD----	-----V	VSESPDSRLS	VY-----	-----
EEEVEIELLH	EFETIPVLSV	ELSPED----	-----	-----
VEDVEIDLLH	EFDFIPVLSV	ELDPQD----	-----	-----
DESIEMELLY	EFEDIPVVS	ELSPED----	-----	-----
-----EIIH	EYTEFPVIYA	ELPEAA----	-----	-----
-----KVDK	QFRIINAACA	KLDKEA----	-----	-----
-----KVDK	QFRIINAACA	KLDKEA----	-----	-----
-----KVDK	QFRIINAACA	KLDKEA----	-----	-----
-----KVDK	QFRIINAACA	KLDKEA----	-----	-----
-----KVDK	QFRIINAGKA	KLDKEA----	-----	-----
-----KVDK	QFRIINAACA	TLDKEA----	-----	-----
-----KVQK	QFKYVNAAAA	TLDEKA----	-----	-----
-----KVQK	QFKYVDAASA	TLNEKA----	-----	-----
-----KVQK	QFKYVDAASA	TLNEKA----	-----	-----
-----AVEVQH	EYENLPVIVS	ELSTEV----	-----	-----
-----HAQK	KYETIPTVLA	ELNKSQ----	-----	-----
-----DVEQ	QYKHLPAVAV	TADQET----	-----	-----
-----KVIY	VADLAPVAII	SIPGKA----	-----	-----
QDQDERATQL	TSETVPELGW	DIHVQSEGQE	EEGPAYHEHQ	AVIRFKPNRD
-----ENEQ	TMKTLPIKTM	TVPVSE----	-----	-----

FIG. 4C

APPROVED	O.G. FIG.	
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Figur 4D

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-----V DALELDPAIS YIE--EDA EV TTM-----A QSV
-----V EALELDPAIS YIE--EDA EV TT-----M QTV
-----V KDLEKDPSIT YIE--EDIEV TIT-----N QVT
-----V SGLKNNPHID FIE--ENEEV EI-----A QTV
-----L KEVKNDPDVA YVE--EDHVA HAL-----A QTV
-----L KEVKNDPDVA YVE--EDHVA HAL-----A QTV
-----L EEVKNDPDVA YVE--EDHVA HAL-----A QTV
-----L KEVKNDPDVA YVE--EDHVA HGL-----G QTV
-----L KEVKNDPDVA YVE--EDHVA HVL-----G QTV
-----L KEVKNDPDVA YVE--EDHVA HAL-----G QTV
-----L EEVKNDPDVA YVE--EDHVA HAL-----A QTV
-----V KELKKDPSVA YVE--EDHIA HEY-----A QSV
-----V KELKKDPSVA YVE--EDHVA HAY-----A QSV
-----V KELKKDPSVA YVE--EDHVA HAY-----A QSV
-----A QLENDPSVE FIE--KNERV YL-----D PLV
-----V DKLRSEPEIA KVQANKTYKV QS-----Q IE
-----V KELKQDPDIL YVENNVSFTA ADSTDFKVLS DGTDTSDNFE
-----V GLLSKLPGVV SVSEGDGVVQA MAKPPWAGGG NKS-QPAEVL
PAAWFATNPY RVVEEAPPFV VIESPNQTTV EIVEALS R--DYDLDFAEPN
-----V ERLKEDPNVV SVSLDQPLQL MSDTR-----ELGEH

PWGISRVQAP AAHNRGLT--GS G---VKVAVL
PWGISRVQAP AAHNRGLT--GS G---VKVAVL
PWGISRVQAP AAHNRGLT--GS G---VKVAVL
PWGISRVQAP AAHNRGLT--GS G---VKVAVL
PWGINRVQAP IAQSRGFT--GT G---VRVAVL
PWGITRVQAP TAWTRGYT--GT G---VRVAVL
PWGIPYIYSD VVHRQGYF--GN G---VKVAVL
PYGIPLIKAD KVQAQGFK--GA N---VKVAVL
PYGIPLIKAD KVQAQGFK--GA N---VKVAVL
PYGIPLIKAD KVQAQGYK--GA N---VKVAVL
PYGIPLIKAD KVQAQGFK--GA N---VKVAVL
PYGIPLIKAD KVQAQGFK--GA N---VKVAVL
PYGIPLIKAD KVQAQGFK--GA N---VKVAVL
PYGIPLIKAD KVQAQGYK--GA N---VKVAVL
PYGISQIKAP ALHSQGYT--GS N---VKVAVI
PYGISQIKAP ALHSQGYT--GS N---VKVAVI
PYGISQIKAP ALHSQGYT--GS N---VKVAVI
PYGVSQIKAP ALHSQGYT--GS N---VKVAVI
PYGVSQIKAP ALHSQGYT--GS N---VKVAVI
PYGVSQIKAP ALHSQGYT--GS N---VKVAVI

```

FIG. 4D

I-GVLGVAPN	AELYAVKVLG	ASGSGSVSSI	AQGLEWAGNN	G-----MH--
I-GVLGVAPS	AELYAVKVLG	ASGSGSVSSI	AQGLEWAGNN	G-----MH--
I-GVLGVAPS	AELYAVKVLG	ASGSGSVSSI	AQGLEWAGNN	G-----MH--
I-GVLGVAPS	AELYAVKVLG	ASGSGAISSI	AQGLEWAGNN	G-----MH--
I-GVLGVAPS	AELYAVKVLG	ADGRGAISSI	AQGLEWAGNN	G-----MH--
I-GVLGVAPN	VDLYGVKVLG	ASGSGSISGI	AQGLQWAANN	G-----MH--
I-GVVGVAPN	AELYAVKVLG	ANGSGSVSSI	AQGLQWTAQN	N-----IH--
Y-GVLGVAPG	AELYAVKVLD	RNGSGSHASI	AQGIEWAMNN	G-----MD--
T-GVLGVAPS	VSLEYAVKVLN	SSGSGSYSGI	VSGIEWATTN	G-----MD--
T-GVLGVAPS	VSLEYAVKVLN	SSGSGTYSGI	VSGIEWATTN	G-----MD--
T-GVLGVAPN	VSLEYAVKVLN	SSGSGSYSGI	VSGIEWATTN	G-----MD--
T-GVLGVAPS	VSLEYAVKVLN	SSGSGSYSGI	VSGIEWVTTN	G-----MD--
T-GVLGVAPS	VSLEYAVKVLN	SSGSGSYSAI	VSGIEWATTT	G-----MD--

[illegible]


```
T-GVLGVAPS VSLFAVKVLN SSGSGSYSGI VSGIEWATTN G-----MD--
T-GVLGVAPN VSLYAVKVLN SSGSGSYSGI VSGIEWATTN G-----MD--
I-GVLGVAPS ASLYAVKVLD STGSGQYSWI INGIEWAISN N-----MD--
I-GVLGVSPS ASLYAVKVLD STGSGQYSWI INGIEWAISN N-----MD--
I-GVLGVAPS ASLYAVKVLD STGSGQYSWI INGIEWAISN N-----MD--
I-GVLGVAPS ASLYAVKVLG ADGSGQYSWI INGIEWAIAN N-----MD--
I-GVLGVAPS ASLYAVKVLG ADGSGQYSWI INGIEWAIAN N-----MD--
I-GVLGVAPS ASLYAVKVLG ADGSGQYSWI INGIEWAIAN N-----MD--
-----APS ASLYAVKVLG ADGSGQYSWI INGIEWAIAN N-----MD--
I-GVLGVAPC ASLYAVKVLG ADGSGQYSWI INGIEWAIAN N-----MD--
E-ASTGIAPN VELYAVKVLN GLGAGSIASI TNGVDWAIAN D-----MD--
V-GIVGVAPD ADLYAVKAFD EFGEGSTSSI TAGVDWAIQH H-----MD--
Y-GIDGIAPE AQIYAVKALD QNGSGDLQSL LQGDWISIAN R-----MD--
I-GVIGVAHS VEIYAVKALG NGGYGSWSDL IIAIDLAVKG PDGVIDADGD
VTGIAGISWK SEILPVKVLN DNGEGSSFEV AKGIYWATDH G-----AK--
L--HOGIAPD VOLYGVKVFS QEKGNTSDL IAGIDWAIQE G-----MD--
```

```

-----VANLSLG SPSPSATLEQ AVNSATSRGV LVVAASGNSG
-----VANLSLG SPSPSATLEQ AVNSATSRGV LVVAASGNSG
-----VANLSLG SPSPSATLEQ AVNSATSRGV LVVAASGNSG
-----VANLSLG SPSPSATLEQ AVNSATSRGV LVVAASGNSG
-----VANLSLG SPSPSATLEQ AVNSATSRGV LVVAASGNSG
-----IANMSLG SSAGSATMEQ AVNQATASGV LVVAASGNSG
-----VANLSLG SPVGSQTLEL AVNQATNAGV LVVAATGNNG
-----IANMSLG SPSGSTTLQL AADRARNAGV LLIGAAGNSG
-----VINMSLG GASGSTAMKQ AVDNAYAKGV VVVAAAGNSG
-----VINMSLG GPSGSTAMKQ AVDNAYARGV VVVAAAGNSG
-----VINMSLG GPSGSTAMKQ AVDNAYARGV VVVAAAGNSG
-----VINMSLG GASGSTAMKQ AVDNAYARGV VVVAAAGNSG
-----VINMSLG GASVSTAMKQ AVDHAYARGA VVVSSAGNSG
-----VINMSLG GPSGSTAMKQ AVDNAYSKGV VPVAAAGNSG
-----VINMSLG GASGSTAMKQ AVDNAYARGV VVVAAAGNSG
-----VINMSLG GPTGSTALKT VVDKAVSSGI VVAAAAGNEG
-----VINMSLG GPTGSTALKT VVDKAVSSGI VVAAAAGNEG
-----VINMSLG GPTGSTALKT VVDKAVSSGI VVAAAAGNEG
-----VINMSLG GPSGSAALKA AVDKAVASGV VVVAAAGNEG
-----VINMSLG GPSGSAALKA AVDKAVASGV VVVAAAGNEG
-----VINMSLG GPSGSAALKA AVDKAVASGV VVVAAAGNEG
-----VINMSLG GPSGSAALKA AVDKAVASGV VVVAAAGNEG
-----VINMSLG GPSGSAALKA AVDKAVASGV VVVAAAGNEG
-----IINMSLG TNTDSEALQR AVERAHDHGI LIIAAAGNSG
-----IINLSVT TVSDDPVLKS ALDKAYNAGI LITAAANDGD
-----IVNMSLG TTSDSKILHD AVNKAYEQGV LLVAASGN-D
GVVAGDPDDD APEVISMSLG GSSPPPELHD VIKAAYNLGI TIVAAAGN-D
-----VINMSLG DYYHSDALRD AVKYAYDHDV VLIAASGNDN
-----IINMSLG YTNEVPAVHT AIKOAVAQEI LVVAASGNNG

```

```
--AG---SIS YPARYANAMA VGATDQNNNR ASFSQYGAGL DIVAPGVNVQ
--AG---SIS YPARYANAMA VGATDQNNNR ASFSQYGAGL DIVAPGVNVQ
--AG---SIS YPARYANAMA VGATDQNNNR ASFSQYGAGL DIVAPGVNVQ
--AG---SIS YPARYANAMA VGATDQNNNR ASFSQYGAGL DIVAPGVNVQ
--AS---SIS YPARYANAMA VGATDQNNNR ASFSQYGAGL DIVAPGVNVQ
```

[illegible]

1997

STYPGSTYAS	-----L	NGTSMATPHV	AGAAALVKQK	-----NP
STYPGSTYAS	-----L	NGTSMATPHV	AGAAALVKQK	-----NP
STYPGSTYAS	-----L	NGTSMATPHV	AGVAALVKQK	-----NP
STYPGSTYAS	-----L	NGTXMATPHV	AGAAALVKQK	-----NP
STYPGSTYAS	-----L	NGTSMATPHV	AGAAALVKQK	-----NP
STVPGNGYSS	-----F	NGTSMATPHV	AGVAALVKQK	-----NP
STYPGNRYAS	-----L	SGTSMATPHV	AGVAALVKQK	-----NP
STYLNNGYRS	-----L	NGTSMASPHV	AGVAALVKQK	-----HP
STYPTNTYAT	-----L	NGTSMASPHV	AGAAALILSK	-----HP
STYPTSTYAT	-----L	NGTSMASPHV	AGAAALILSK	-----HP
STYPTSTYAT	-----L	NGTSMASPHV	AGAAALILSK	-----HP
STYPTNTYTT	-----L	NGTSMASPHV	AGTSALILSK	-----HP
STYPTNTYAT	-----L	NGTSMASPHV	AGAAALILSK	-----HP
STYPTNTYAT	-----L	NGTSMASPHV	AGAAALILSK	-----HP
STYPTSTYAT	-----L	NGTSMASPHV	AGAAALILSK	-----HP
STLPGGTYGA	-----Y	NGTSMATPHV	AGAAALILSK	-----HP
STLPGGTYGA	-----Y	NGTCMATPHV	AGAAALILSK	-----HP
STLPGGTYGA	-----Y	NGTSMATPHV	AGAAALILSK	-----HP
STLPGNKYGA	-----Y	NGTSMASPHV	AGAAALILSK	-----HP
STLPGNKYGA	-----Y	NGTSMASPHV	AGAAALILSK	-----HP
STLPGNKYGA	-----Y	SGTCMASPHV	AGAAALILSK	-----HP
STLPGNKYGA	-----K	SGTCMASPHV	AGAAALILSK	-----HP
STLPGNKYGA	-----K	SGTSMASPHV	AGAAALILSK	-----HP
STFLFNRYER	-----L	SGTSMASPHV	TGAAALIKSN	-----NP
STFPINLDTT	DGKKDGYTAL	SGTSMALPHL	YTGALAATLK	-----TS
STYLNQYYAT	-G-----	SGTSQATPHA	AAMFALLKQR	-----DP
STYPDDTYEE	-----L	SGTSMATPHV	SGTVALIQAA	RLAAGLPLLP

APPROVED	O.G. FIG.	
BY	CLASS	SUBCLASS
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Figur 4H

SLFPDNQYTV -----M SGTSMASPHA AGLAGLIRSL -----RP
GLAPGNKYVF -----M SGTSQATPHV TSLAAILMGK -----HP

-----SWSNV QIRNHLKNTA TSLGSTNL-- -YGSGLVN-- -----
-----SWSNV QIRNHLKNTA TSLGSTNL-- -YGSGLVN-- -----
-----SWSNV QIRNHLKNTA TGLGNTNL-- -YGSGLVN-- -----
-----SWSNV QIRNHLKNTA TSLGSTNL-- -YGSGLVN-- -----
-----SWSNV QIRNHLKNTA TSLGSTNL-- -YGSGLVN-- -----
-----SWSNV QIRNHLKNTA TNLGNTNQ-- -FGSGLVN-- -----
-----SWSNT QIRQHLTSTA TSLGNSNQ-- -FGSGLVN-- -----
-----HLTAA QIRNRMNQTA IPLGNSTY-- -YGNGLVD-- -----
-----NLSAS QVRNRLSSTA TYLGSSFY-- -YGKGLIN-- -----
-----NLSAS QVRNRLSSTA TYLGSSFY-- -YGKGLIN-- -----
-----NLSAS QVRNRLSSTA TYLGSSFY-- -YGKGLIN-- -----
-----NLSAS QVRNRLSSTA TYLGSSFY-- -YGKGLIN-- -----
-----NLSAS QVRNRLSSTA TYLGSSFY-- -YGKGLIN-- -----
-----NLSAS QVRNRLSSTA TYLGSSFY-- -YGKGLIN-- -----
-----NLSAS QVRNRLSSTA TYLGSSFY-- -YGKGLIN-- -----
-----NLSAS QVRNRLSSTA TYLGSSFY-- -YGKGLIN-- -----
-----NLSAS QVRNRLSSTA TYLGSSFY-- -YGKGLIN-- -----
-----TWTNA QVRDRLESTA TYLGNSFY-- -YGKGLIN-- -----
-----TWTNA QVRDRLESTA TYLGNSFY-- -YGKGLIN-- -----
-----TWTNA QVRDRLESTA TYLGNSFY-- -YGKGLIN-- -----
-----NWTNT QVRSSLENTT TKLGDSFY-- -YGKGLIN-- -----
-----NWTNT QVRSSLENTT TKLGDSFY-- -YGKGLIN-- -----
-----NWTNT QVRSSLENTT TKLGDSFY-- -YGKGLIN-- -----
-----NWTNT QVRSSLENTT TKLGDSFY-- -YGKGLIN-- -----
-----NWTNT QVRSSLENTT TKLGDSFY-- -YGKGLIN-- -----
-----NWTNT QVRSSLENTT TKLGDSFY-- -YGKGLIN-- -----
-----ELTNE QIRKRLNTTA TPLGNPFY-- -YGHGLLN-- -----
--IKTNRPAQ NPQNTSDQNA KDLGTAGKDS LYGYGLVQIK TFQP-----
--AETNVQL- --REEMRKNI VDLGTAGRDQ QFGYGLIQYK AQAT-----
PGSESDTTPD TVRGVLHTTA TDAGDPGYDS LYGYGIID-- -----
-----DLSNQ EVMDIMKKA KDLGPKGHDV YYGHGEID-- -----
-----ELSSQ QIRALLVEQS LDLGSEGHDR LYGYGLAQYV SSTPPDEEN

-----AEAATR -----
-----AEAATR -----
-----AEAATR -----
-----AEAATR -----
-----AEAATR -----
-----AEAATR -----
-----AEAATR -----
-----AEAATR -----
-----AEYAAQ -----
-----V-----
-----VEAAAQ -----
-----VEAAAQ -----
-----VEAAAQ -----
-----VEAAAQ -----
-----VEAAAQ -----
-----VEAAAQ -----
-----VQAAAQ -----
-----VQAAAQ -----
-----VQAAAQ -----
-----VQAAAQ -----

FIG. 4H

[illegible]

7-00000 **7-00000** **7-00000** **7-00000** **7-00000**

APPROVED	O.G. FIG.	
BY	CLASS	SUBCLASS
DRAFTSMAN		

Figure 4M

NGTGSEPQAE ESNEQNNKDG TLPKTATNLY NSLAIGALL LIGFVLLRKS

KRRIVE

[illegible]